A2 cont'd

absorption spectrum region of oxygen, to a semiconductor device manufacturing method that utilizes this exposure apparatus, and to a semiconductor device manufacturing plant in which this exposure apparatus is installed. --

Please substitute the paragraph beginning at page 3, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A3

-- With an exposure apparatus that uses an $F_2$ excimer laser, on the other hand, the emission spectral line of the $F_2$ excimer laser beam overlaps the absorption spectrum region of oxygen. The serious problems that result are the aforementioned decline in transmittance ascribed to absorption of light by oxygen and the evolution of ozone. For example, the transmittance of an $F_2$ excimer laser in the atmosphere is actually on the order of 0.1 %/mm. It is believed that the decline in transmittance is the result not only of absorption of light by oxygen but also of the effects produced by the evolution of ozone. The production of ozone not only causes a decline in transmittance but may also contaminate the surface of optical members, which are used in the projection optical unit, owing to a chemical reaction between ozone and other substances. There is the possibility that such contamination will degrade the exposing capability of the exposure apparatus. --

Please substitute the paragraph beginning at page 7, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The present invention further provides a method of manufacturing a semiconductor device, the method comprising the steps of: placing a group of manufacturing equipment for performing various processes, inclusive of the above-described exposure apparatus, in a plant for manufacturing semiconductor devices; and manufacturing a semiconductor device by a plurality of processes using this group of manufacturing equipment. --

Please substitute the paragraph beginning at page 7, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The present invention further provides a plant for manufacturing a semiconductor device, comprising: a group of manufacturing equipment for performing various processes, inclusive of the above-described exposure apparatus; a local-area network for interconnecting the group of manufacturing equipment, and a gateway for making it possible to access, from the local-area network, an external network outside the plant, whereby information relating to at least one of the pieces of manufacturing equipment can be communicated by data communication. --

Please substitute the paragraph beginning at page 9, line 15, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- As shown in Fig. 1, the exposure apparatus has an exposing light source 6, for emitting short-wavelength light, such as an $F_2$ excimer laser. Light emitted from the exposing light source 6 is reflected by a mirror 19 and uniformly irradiates a reticle 7, which has been placed on a reticle stage 15, via an illuminating optical member 12. --

Please substitute the paragraph beginning at page 10, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The illuminating optics unit, reticle stage 15, projection optics unit 13 and substrate stage 9 are accommodated within a chamber 14. At such time, the interior of the chamber 14 is filled nitrogen gas, which is one of the inert gases, and the interior of the chamber 14 is held at a value of a pressure higher than that of the pressure outside the chamber. The atmosphere within the chamber 14 is controlled by a pressure controller 2, nitrogen gas supply unit 3 and pump 1. --

Please substitute the paragraph beginning at page 11, line 11, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The reticle 7 is exchanged for another via a reticle load-lock chamber 7. This, too, means that there is no decline in throughput and no disruption of the atmosphere within the chamber 14. --

Please substitute the paragraph beginning at page 12, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The second method exercises control in such a manner that the value of pressure inside the chamber 14 is regulated to a fixed value (indicated by the dashed line B in Fig. 2) higher than the peak value of pressure outside the chamber 14, which varies as indicated by the solid line in Fig. 2. With this method, the value of the pressure inside the chamber 14 is kept constant and,

therefore, it is unnecessary to frequently correct the optical characteristics of the projection optics unit 13. --

Please substitute the paragraph beginning at page 13, line 19, and ending on page 14, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Though the present invention relates to an exposure apparatus using an exposing light source that emits short-wavelength light such as the light from an $F_2$ excimer laser, it should be obvious that the invention can be applied effectively also to a photoresist of the type that cannot be used in an oxygen atmosphere and to a substrate coated with a such a photoresist. Furthermore, it goes without saying that the projection optics unit 13 can be applied effectively to any of a reflecting unit, reflecting-refraction unit and refraction unit. --

Please substitute the paragraph beginning at page 17, line 9, and ending on page 19, line 7, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 5 is a conceptual view illustrating the overall system of this embodiment expressed according to an aspect different from that depicted in Fig. 4. In the earlier example, a plurality of user plants each having manufacturing equipment are connected by an external network to the management system of the vendor that provided the manufacturing equipment, and information concerning the production management of each plant and information concerning at least one

piece of manufacturing equipment is communicated by data communication via the external network. In the example of Fig. 5, on the other hand, a plant having manufacturing equipment provided by a plurality of vendors is connected by an outside network to management systems of respective ones of the vendors of these plurality of pieces of manufacturing equipment, and maintenance information for each piece of manufacturing equipment is communicated by data communication. This system includes a manufacturing plant 201 of the user manufacturing equipment (the maker of semiconductor devices). The manufacturing line of this plant includes manufacturing equipment for implementing a variety of processes. Examples of such equipment are exposure equipment 202, resist treatment equipment 203 and thin-film treatment equipment 204. Though only one manufacturing plant 201 is shown in Fig. 5, in actuality a plurality of these plants is networked in the same manner. The pieces of equipment in the plant are interconnected by a LAN 206 to construct an intranet and the operation of the manufacturing line is managed by a host management system 205. The places of business of vendors (equipment suppliers) such as an exposure equipment maker 210, resist treatment equipment maker 220 and thin-film treatment equipment maker 230 have host management systems 211, 221, 231, respectively, for remote maintenance of the equipment they have supplied. These have maintenance databases and gateways to the outside network, as described earlier. The host management 205 for managing each piece of equipment in the manufacturing plant of the user is connected to the management systems 211, 221, 231 of the vendors of these pieces of equipment by the Internet or leased-line network serving as an external network 200. If any of the series of equipment in the manufacturing line malfunctions, the line ceases operating. However, this can

cont'd

be dealt with rapidly by receiving remote maintenance from the vendor of the faulty equipment via the Internet 200, thereby making it possible to minimize line downtime. --

Please substitute the paragraph beginning at page 20, line 16, and ending on page 21, line 17, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 7 illustrates the overall flow of a process for manufacturing semiconductor devices. The circuit for the device is designed at step 1 (circuit design). A mask on which the designed circuit pattern has been formed is fabricated at step 2 (mask fabrication). Meanwhile, a wafer is manufactured using a material such as silicon or glass at step 3 (wafer manufacture). The actual circuit is formed on the wafer by lithography, using the mask and wafer that have been prepared, at step 4 (wafer process), which is also referred to as “pre-treatment”. A semiconductor chip is obtained, using the wafer fabricated at step 4, at step 5 (assembly), which is also referred to as “post-treatment”. This step includes steps such as actual assembly (dicing and bonding) and packaging (chip encapsulation). The semiconductor device fabricated at step 5 is subjected to inspections such as an operation verification test and a durability test at step 6 (inspection). The semiconductor device is completed through these steps and then is shipped (step 7). The pre- and post-treatments are performed at separate special-purpose plants. Maintenance is carried out on a per-plant basis by the above-described remote maintenance system. Further, information for production management and equipment maintenance is communicated by data communication between the pre- and post-treatment plants via the Internet or leased-line network. --